

## Short communication

# Innovative use of anterior subapical setback combined with bilateral sagittal split osteotomy in patients with obstructive sleep apnoea

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## Abstract

We describe the use of anterior mandibular subapical setback osteotomy combined with bilateral sagittal split osteotomy in the treatment of selected patients with obstructive sleep apnoea (OSA). The technique enables maximal mandibular advancement, it alleviates pharyngeal narrowing, and minimises the alteration to the mid facial profile that is associated with traditional maxillomandibular advancement.

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## Introduction

Over the last 30 years numerous studies have reported improvements in the results of sleep studies in patients who have had mandibular osteotomy with advancement.<sup>1,2</sup> Maxillomandibular advancement has been favoured over single jaw procedures in patients with obstructive sleep apnoea (OSA), in order to preserve the maxillomandibular relationship, and also perhaps due to the recognition that the obstruction typically occurs at more than one level.

The alterations to the face associated with maxillomandibular advancement may be not acceptable to all patients. It is noteworthy that most of those with OSA do not have a retrognathic mandible or maxilla so the possibility of dissatisfaction with the resultant profile is an important consideration. Mandibular advancement may be more appropriate than a combined operation on the upper and lower jaw

in patients with retrolingual obstruction alone and in those who have previously had a procedure to relieve retropalatal obstruction. The risk of velopharyngeal incompetence might be greater in those who have maxillomandibular advancement after procedures such as uvulopalatopharyngoplasty.

Subapical osteotomy has historically been popular because of its versatility, and it has been used to move the anterior mandibular teeth and alveolus in almost every conceivable direction.<sup>3–5</sup> It affords the opportunity to alter the curve of Spee and to close spaces in the mandibular arch, and also avoids the need for preoperative orthodontics in patients with a class II malocclusion.

## Technique

The operation is planned using a surgical model (Fig. 1) then intermediate and final wafers, and custom-made arch bars are fabricated.

The intraoperative steps are shown in Fig. 2. The anterior subapical osteotomy is combined with premolar extractions, or spaces in the premolar or first molar region are used. The horizontal cuts during segmental osteotomy should be at least

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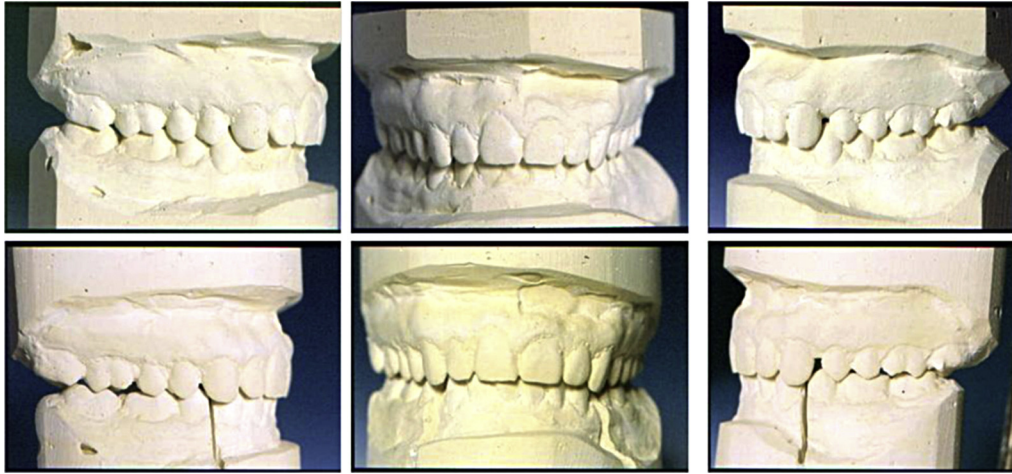


Fig. 1. Preoperative model operation.

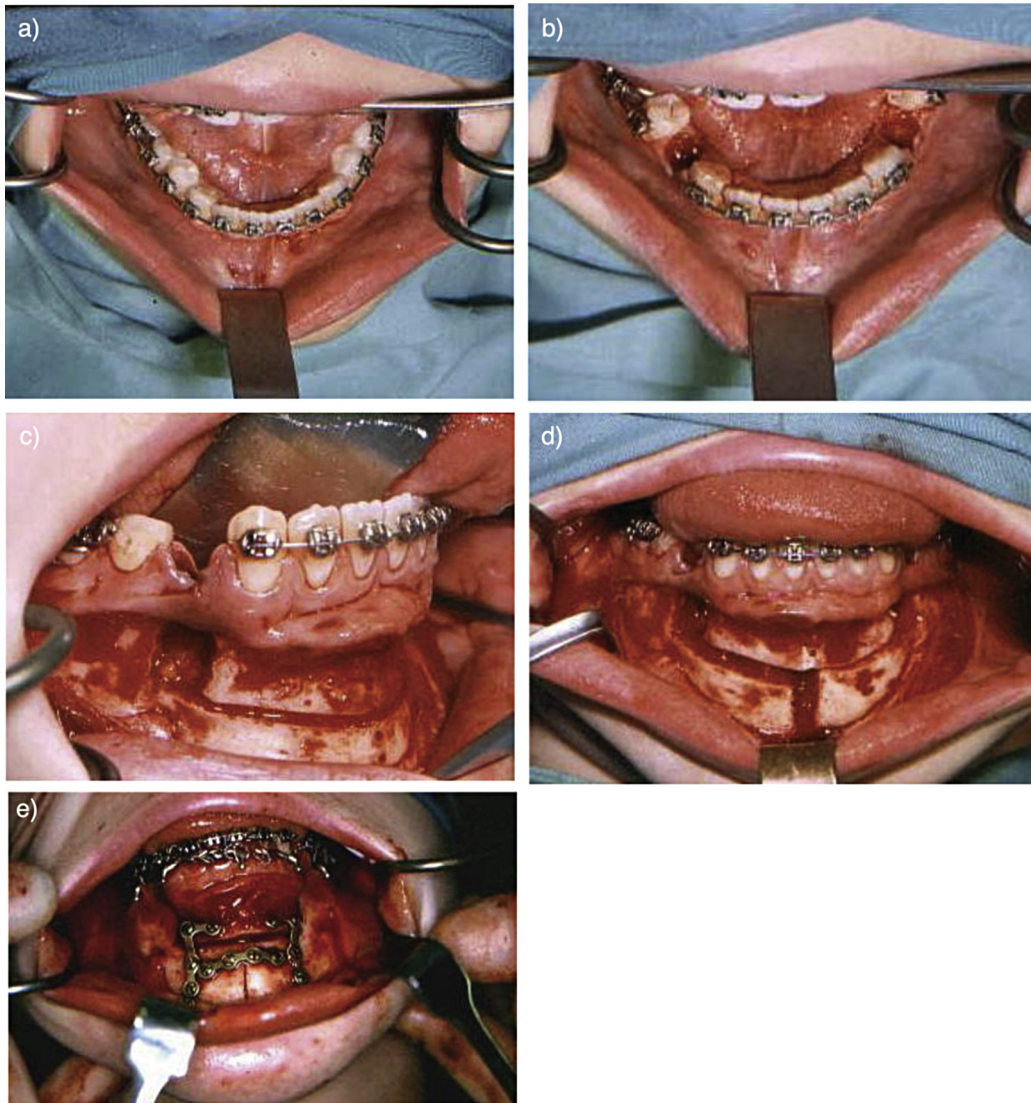


Fig. 2. (A) Preoperative image; (B) bilateral premolar extractions; (C) anterior segmental osteotomy before total mandibular advancement; (D) midline mandibulotomy; (E) temporary intraoperative intermaxillary fixation with intermediate wafer and rigid internal fixation of segments. A significant overjet is achieved before sagittal split advancement.

5 mm below the apices of the teeth to ensure the vitality of the mobilised dentoalveolar segment, and above the lingual attachments.

Midline mandibulotomy is often required to narrow the width of the mandibular arch and to ensure that it aligns and coordinates well with the maxillary arch. It also enables slight condylar rotation, but it is important to avoid medial and lateral movements. The mobile segments are stabilised with rigid internal fixation. Substantial overjet is achieved before the mandible is advanced by about 8 mm (equivalent to the width of one premolar) to re-establish the pre-existing occlusion.

The technique is particularly useful in patients with OSA who have a significant class II preoperative profile, and who decline, or are unsuitable for, orthodontic treatment. The anterior mandibular subapical setback osteotomy allows the lower labial segment to be retracted and set upright before total mandibular advancement. The combined procedure rectifies retrolingual narrowing and has the added benefit of improving the dental occlusion and facial appearance.

## Discussion

Maxillomandibular advancement is currently the most effective surgical treatment of OSA in adults.<sup>2,6</sup> Bimaxillary advancement enlarges the pharyngeal space by expanding the skeletal framework to which the soft-tissue pharyngeal structures and tongue are attached, and reduces pharyngeal collapsibility during sleep.

Our technique for single jaw advancement has a number of advantages over bimaxillary operations. The base of the tongue can be considerably advanced to alleviate retrolingual obstruction, and the technique reduces the degree of alteration to the facial profile, as it avoids mid-facial advancement and the bimaxillary protrusion that is associated with classic maxillomandibular advancement. The small potential risk of velopharyngeal incompetence in patients who have previously had traditional uvulopalatopharyngoplasty is largely obviated. There is also a reduction in surgical morbidity and operating time.

The procedure may appeal to patients who have benefited from mandibular advancement devices and wish to have a more permanent solution. Alternatively, it can be done as part of a bimaxillary procedure: smaller maxillary, and



Fig. 3. Anterior mandibular subapical setback with bilateral sagittal split osteotomy and Le Fort I advancement for obstructive sleep apnoea.

much larger mandibular advancement to maximise the space in the posterior airway in patients with severe retrolingual obstruction (Fig. 3).

We have found this modification to be a useful option in the management of selected patients with OSA. Postoperative outcomes have been good, and patients have been satisfied with the aesthetic results, particularly those who had an unfavourable soft tissue profile such as an acute nasolabial angle before operation.

## Conflict of interest

We have no conflicts of interest.

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